

Title (en)  
LANCED SINE-WAVE HEAT EXCHANGER

Publication  
**EP 0319451 B1 19930224 (EN)**

Application  
**EP 88630223 A 19881201**

Priority  
US 12783787 A 19871202

Abstract (en)  
[origin: EP0319451A1] A sine-wave like plate fin (12) for a finned tube heat exchanger coil is provided having an improved enhanced heat transfer area between adjacent pairs of holes (16) in the plate fin (12). The enhanced heat transfer area includes a plurality of raised lance elements (36,38) disposed thereon generally at the peaks and troughs of the sine-wave wherein the raised elements (36) at the peaks are concave and the raised elements (38) at the troughs are convex.

IPC 1-7  
**F28F 1/12**

IPC 8 full level  
**F28F 1/32** (2006.01)

CPC (source: EP KR US)  
**F28F 1/325** (2013.01 - EP US); **F28F 3/00** (2013.01 - KR); **Y10S 165/502** (2013.01 - EP US)

Cited by  
US5738168A; DE10227930A1; EP0575287A1; EP4300026A1; WO0053990A1

Designated contracting state (EPC)  
ES FR IT

DOCDB simple family (publication)  
**EP 0319451 A1 19890607**; **EP 0319451 B1 19930224**; AR 240518 A1 19900430; BR 8806326 A 19890815; CA 1277976 C 19901218; DZ 1282 A1 20040913; ES 2038334 T3 19930716; IN 170060 B 19920201; JP H01193596 A 19890803; JP H0459556 B2 19920922; KR 890010527 A 19890809; MX 166736 B 19930201; US 4860822 A 19890829

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**EP 88630223 A 19881201**; AR 31260688 A 19881202; BR 8806326 A 19881201; CA 579985 A 19881013; DZ 880195 A 19881130; ES 88630223 T 19881201; IN 993CA1988 A 19881201; JP 30584388 A 19881202; KR 880016059 A 19881202; MX 1400088 A 19881130; US 12783787 A 19871202